

Leica ScanStation 2
User Manual

Version 1.0
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on the purchase of a ScanStation 2 instrument.



This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "6 Safety Directions" for further information.
Read carefully through the User Manual before you switch on the product.

Product identification

The type and the serial number of your product are indicated on the type plate. Enter the model and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorized service workshop.

Type: _____

Serial No.: _____

Network Address: _____

IP Address: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
Warning	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
Caution	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and/or appreciable material, financial and environmental damage.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Trademarks

- Windows is a registered trademark of Microsoft Corporation

All other trademarks are the property of their respective owners.

Table of Contents

In this manual

Chapter		Page
1	**Description of the System**	**7**
1.1	Packing / Unpacking	7
1.2	Instrument Components	8
1.3	Cabling	12
1.4	Field of View (FoV)	17
1.5	HDS *Cyclone* Software Suite	19
2	**Setting Up the Instrument**	**22**
2.1	General Information	22
2.2	Scanner Setup on Tripod	23
2.3	Setup the ScanStation 2 Over a Benchmark	25
2.4	Instrument Height	28
2.5	Power Supply and Charging	29
2.6	Operate the Instrument With the Power Supply	33

3 Scanning **34**

3.1 Turn On the System 34
3.2 Understand the Instrument's Control LED Status 36
3.3 Ambient Conditions 38
3.4 Reinstalling Window Covers 40
3.5 Network Address 41

4 Troubleshooting **42**

4.1 Network Connection 42
4.2 Diagnostic Procedure 46

5 Care and Transport **50**

5.1 Check & Adjust 50
5.2 Transport 51
5.3 Storage 52
5.4 Cleaning and Drying 53
5.5 Window Cleaning Procedure 54
5.6 Adjustment of the Circular Level 56
5.7 Service of the Tripod 58

6 Safety Directions 59

6.1 General 59
6.2 Intended Use 60
6.3 Limits of Use 62
6.4 Responsibilities 63
6.5 International Warranty, Software Licence Agreement 64
6.6 Hazards of Use 66
6.7 Laser Classification Scanner, Visible Laser 75
6.8 Electromagnetic Compatibility EMC 81
6.9 FCC Statement, Applicable in U.S. 83

7 Technical Data 86

7.1 General Technical Data of the Instrument 86
7.2 System Performance 87
7.3 Laser Scanning System 88
7.4 Electrical 90
7.5 Environmental 91
7.6 Physical 92
7.7 Accessories 93
7.8 Formats 97

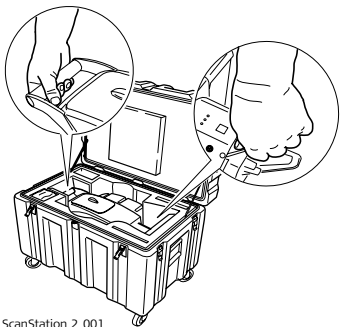
Index 98

1 Description of the System

1.1 Packing / Unpacking

Unpacking

When in its case, the ScanStation 2 sits face-up so that the product label is visible.



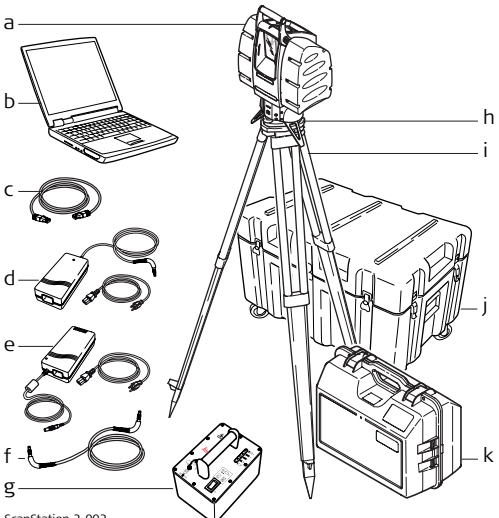
"Instrument" will be used for ScanStation 2 in this manual.

The instrument is wrapped in an antistatic bag at delivery.
It is recommended to keep this bag, as it can be used in the field to protect the instrument from dust and rain.
To take the instrument out of its case, grasp the handle and the table stand, and lift.
Use caution due to the weight of the instrument (18.8 kg).

Pack the instrument the same way it is delivered. Make sure the instrument is in "Lock" position.

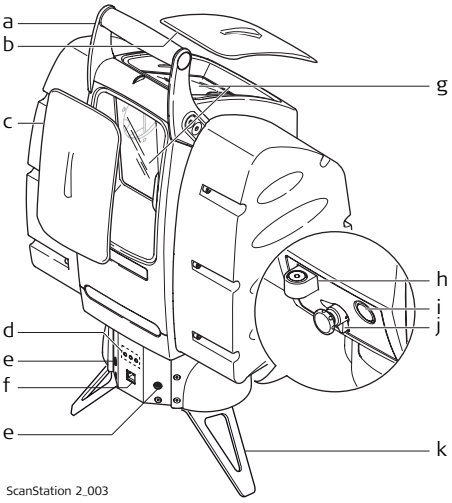
1.2 Instrument Components

Overall system



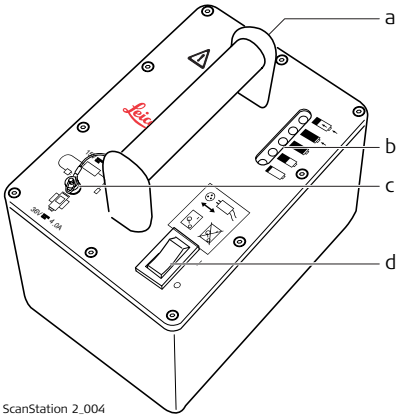
a) ScanStation 2 Laser Scanner; including protective covers
b) Laptop - optional
c) Ethernet cable
d) Power supply charger with power cable
e) A/C power supply with power cable - optional
f) Power supply cable
g) Power supply
h) Tribrach, with optical plummet
i) Tripod
j) Transport box for Scan-Station 2
k) Transport box for power supply

ScanStation 2



a) Handle
b) Top Window Cover
c) Front Window Cover
d) LED indicators
e) Connector for power supply (2)
f) Ethernet Connector
g) Top Window/Front Window
h) Circular level
i) QuickScan^{TM} Button
j) Lock Knob
k) Table Stand

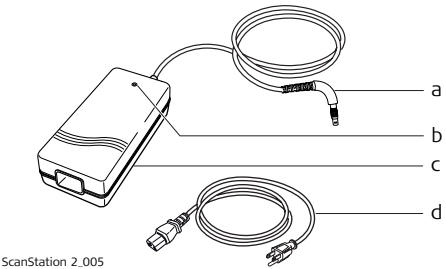
Power supply



ScanStation 2_004

a) Handle
b) Power supply status indicators
c) Power connector
d) Main switch

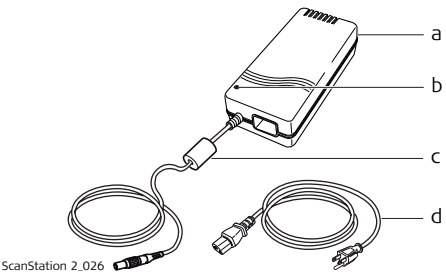
Power supply charger



ScanStation 2_005

a) Charger cable
b) Control LED; lights when the charger is connected to a power plug.
c) Power supply charger
d) Power cable; three different types delivered

A/C power supply

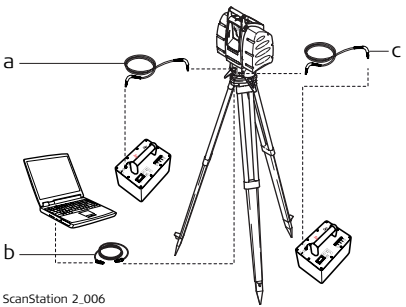


ScanStation 2_026

a) A/C power supply
b) Control LED; lights when the A/C power supply is connected to a power plug.
c) A/C power supply cable
d) Power cable; three different types delivered

1.3 Cabling

Operate the instrument with the power supply

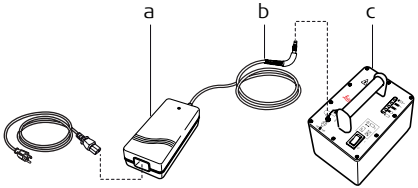


a) Power supply cable (from instrument to 1st power supply)
b) Ethernet cable
c) Power supply cable (from instrument to 2nd power supply)

Switch the power supply OFF before connecting to or disconnecting from the scanner.

The instrument is equipped with two power connectors. It can be operated using one or two power supplies. If two power supplies are connected, the instrument will operate from both power supplies concurrently. Make sure that the second power supply is switched ON before the first power supply is empty. If the instrument was powered up using a single power supply, a second power supply can be connected anytime during operation. when connecting or disconnecting, power supply must be off.

Charging the power supply with the charger



a) Power supply charger with power cable
b) Charging cable
c) Power supply

The power supply charger is not designed to be an A/C power supply for the instrument. It is exclusively designed for charging the power supply and should not be connected to the instrument. If the charger plug is accidentally connected to the instrument, it will not damage the instrument or the charger.

⚠ Danger

The product is not designed for use under wet and severe conditions. If unit becomes wet it may cause you to receive an electric shock.

Precautions:

Use the product only in dry environments, for example in buildings or vehicles. Protect the product against humidity. If the product becomes humid, it must not be used!



⚠ Danger

Death or serious injury can occur if unit is not connected to ground.

Precautions:

To avoid electric shock power cable and power outlet must be grounded.



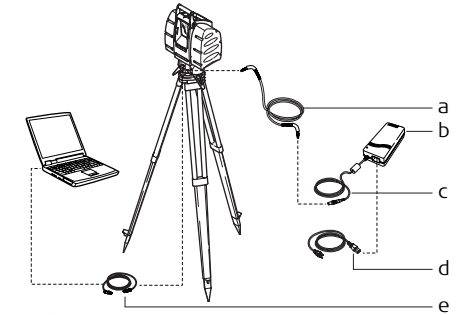
⚠ Warning

Batteries not recommended by Leica Geosystems may be damaged if charged or discharged. They may burn and explode.

Precautions:

Only charge and discharge batteries recommended by Leica Geosystems.

Operate the instrument with the A/C power supply



ScanStation 2_008

a) Power supply cable
b) A/C power supply
c) A/C power supply cable
d) Power cable
e) Ethernet cable

⚠ Danger

The product is not designed for use under wet and severe conditions. If unit becomes wet it may cause you to receive an electric shock.

Precautions:

Use the product only in dry environments, for example in buildings or vehicles. Protect the product against humidity. If the product becomes humid, it must not be used!



⚠ Danger

Death or serious injury can occur if unit is not connected to ground.
Precautions:
To avoid electric shock power cable and power outlet must be grounded.



Laptop

A dedicated laptop computer is an option with your ScanStation 2 System. This computer is loaded with proprietary software, and is configured to operate with your instrument.

☞

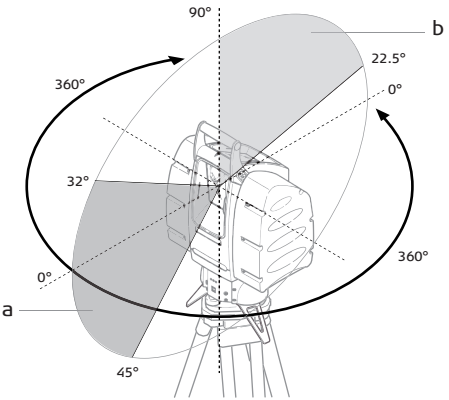
It is recommended that you **do not use your dedicated laptop computer for any purpose other than scanning** with your instrument or *Cyclone* applications.

Using software, LAN cards or modems that are not specifically designed to work with your dedicated laptop computer can corrupt the settings in your computer, and can adversely affect system performance.

1.4 Field of View (FoV)

Field of view

The instrument has a dual window system that covers a 360 x 270 degree field of view. The main window (a) measures up to 45 degrees below the horizontal and up to 32 degrees above the horizontal. The upper window (b) measures from 22.5 degrees up to the zenith (90°).



ScanStation 2_009

If selecting a scanning region that uses both the main and upper windows, the instrument automatically goes through the following steps
(as an example a vertical extent of -20 to 50 degrees):

1. The instrument starts scanning using the main window and scans from -20 to 32 degrees.
2. It then makes a 180 degrees horizontal rotation.
3. It finishes the scan (32 to 50 degrees) using the upper window.

1.5 HDS *Cyclone* Software Suite

General

Leica Geosystems HDS *Cyclone* - software modules provide point cloud users with the widest set of work process options for 3D laser scanning projects in engineering, surveying, construction and related applications.
The Software consist of four packages:

- *Cyclone*-Scan:
  allows the user to control the Scanner
- *Cyclone*-Register:
  allows the user to register multiple Scans together or to Geo-reference the point cloud
- *Cyclone*-Survey:
  gives the user basic functionality to extract and measure information out of the rich point cloud
- *Cyclone*-Model:
  gives the user the full functionality of *Cyclone*. The user is able to extract and measure features and to create a 3D Model out of the PointCloud



- For more information on *Cyclone* Software Suite, please visit:
  http://www.leica-geosystems.com/hds
- *Cyclone* Software has also online help available, which can be accessed through the F1 key on your keyboard.

General Operating Principles

- **Download:**
  Cyclone Software, as well as important Support documentation, can be downloaded from the Leica Geosystems HDS Website (http://www.leica-geosystems.com/hds/en/lgs_27054.htm).
  The User must create an account before the download section is accessible.
- **Installation:**
  You must use a Windows account with administrator privileges to install or upgrade *Cyclone*, CloudWorx for AutoCAD, or CloudWorx for Intergraph SmartPlant® Review.

☞ Windows 2000 users:
If *Cyclone*, CloudWorx for AutoCAD, or CloudWorx for Intergraph SmartPlant® Review fails to launch with an "entry point HeapSetInformation" error message after installing or upgrading,

A) install Windows 2000 Service Pack 3 or Service Pack 4 with all available security updates (recommended), or
B) install the Microsoft hotfix for KB816542 (download and unzip the file, then run "Windows2000-KB816542-x86-ENU.exe" to install the hotfix).

1. Download the *Cyclone* Installshield from the website specified above.
2. Run the Installation file.

3. Follow the onscreen instructions and select the software you wish to install.
4. Go to the License Request Page

- **Language:**
  Cyclone's operating Language is English.

2 Setting Up the Instrument

2.1 General Information

Use the tripod

The instrument should always be set up on its tripod. Using the tripod delivered with the scanning system guarantees a maximum of stability during scanning operations.



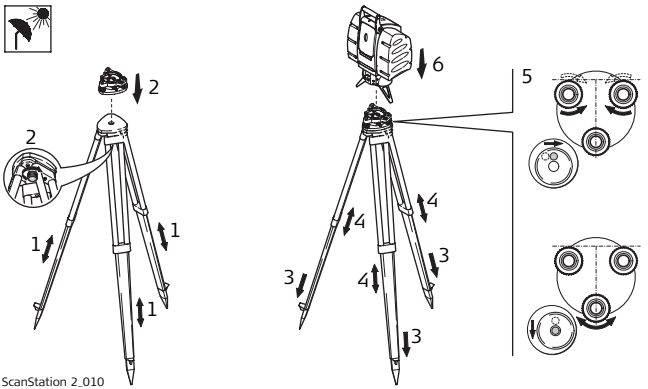
Always set up the instrument on its tripod. Do not set up the instrument directly on the ground for scanning operations.
Never operate the scanner using the table stand.



It is always recommended to shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

2.2 Scanner Setup on Tripod

Setup step-by-step



ScanStation 2_010

Step	Description
	Shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

Step	Description
1.	Extend the tripod legs to allow for a comfortable working posture. Tighten the screws at the bottom of the legs.
2.	Place the tribrach on the tripod and secure it with the central fixing screw.
3.	Set up the tripod so that the tripod plate is as horizontal as possible.
4.	Push the tripod legs firmly into the ground.
5.	Level up the tribrach using the circular level. Turn two of the foot screws together in opposite directions. The index finger of your right hand indicates the direction in which the bubble should move. Now use the third foot screw to centre the bubble.
6.	Place the instrument on the tribrach and secure it with the tribrach's locking knob. Make sure that the instrument is levelled by checking the built-in circular level.
	The instrument must be levelled before it is switched **ON**. If not levelled using the tribrach's or the instrument's circular level, it may not power up properly or scanning accuracy may not be achieved.
	When placing the instrument on the tribrach, align the legs of the scanner's table stand with the foot screws of the tribrach.

2.3 Setup the ScanStation 2 Over a Benchmark

Description

Geo-referencing of the ScanStation 2 is established by setting up over a known or assumed control point, with optional target extraction to set the azimuth direction, and establishing a local or global coordinate system.
ScanStation 2 allows you to traverse, resection or free-station. Known azimuth or known backsight measurements can be observed.

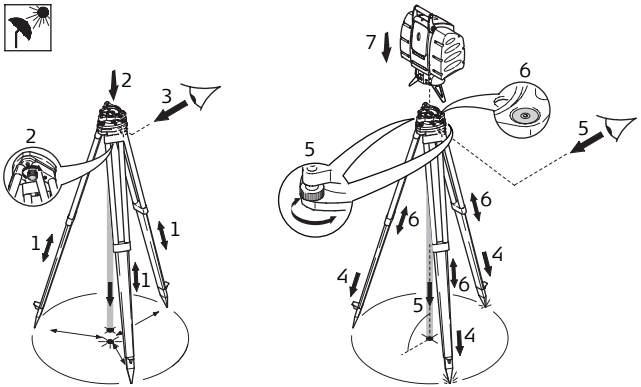


It is always possible to set up the instrument without the need for a marked ground point.



The data scanned with ScanStation 2 is corrected by an internal dual-axis compensator, when the dual-axis compensator is enabled (by *Cyclone*).

Setup step-by-step



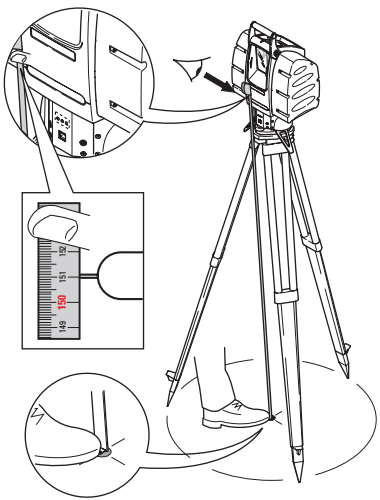
ScanStation 2_011

Step	Description
☞	Shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.
1.	Extend the tripod legs to allow for a comfortable working posture. Position the tripod approximately over the marked ground point.
2.	Fasten the tribrach onto the tripod.

Step	Description
3.	Inspect the tripod from various sides and correct its position so that the tripod plate is roughly horizontal and above the ground point. You may use the tribrach's optical plummet to help place the tripod over the ground point.
4.	Push the tripod legs firmly into the ground.
5.	Look through the optical plummet and turn the tribrach's foot screws so that the optical plummet is centered on the ground point.
6.	Adjust the tripod legs to level the circular level.
7.	Place the instrument on the tribrach and secure it with the tribrach's locking knob. Make sure that the instrument is levelled by checking the built-in circular level.
☞	Please see also "Scanning with ScanStation 2" section in the *Cyclone* documentation for more information.

2.4 Instrument Height

Measure instrument height



ScanStation 2_012

To get an accurate measurement, hold end of measurement tape with your foot on benchmark. Now expand the measurement tape and read height using etched horizontal reference line on unit.

Do not reduce the instrument height reading to its vertical value!

The instrument height entered in *Cyclone* is automatically computed and reduced to its vertical value.

Take care to use a 1:1 measure, no special tape that is scaled differently (used for common surveying instruments).

2.5 Power Supply and Charging

Charging / first-time use

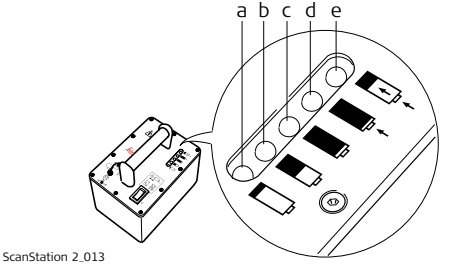
- The batteries must be charged prior to using for the first time because it is delivered with an energy content as low as possible.
- The permissible temperature range for charging is between 0°C to +40°C /+32°F to +104°F. For optimal charging we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.

Operation/Discharging

- The batteries can be operated from 0°C to +40°C / +32°F to +104°F.
- Low operating temperatures reduce the capacity that can be drawn; very high operating temperatures reduce the service life of the battery.

As the power supply contains batteries, it is always recommended to handle the power supply with care. Observe the LEDs on the power supply before and after the charging process, as well as during operation. For details please refer to the picture and description of the LEDs below.

Understand the power supply condition indicators



ScanStation 2_013

a) Low power level
b) Power supply is half empty
c) High power level
d) Fully charged
e) Charging

If the battery is turned on and not connected to the scanner:



Amber color indicates that the power supply is charging.

Amber color switches on when the power supply is fully charged.

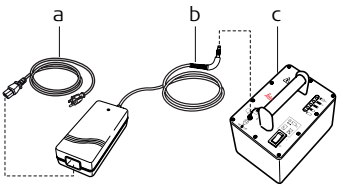
Green color indicates high power supply level. It stays on for approximately one hour and twenty minutes at room temperature.

Yellow color switches on when power supply is half empty. It stays on for approximately one hour and twenty minutes at room temperature.

Red color indicates low power level. When it switches on, approximately twenty minutes of operation are left before the instrument is powered off.

Charge the power supply

1. Plug the charger cable (b) into the power supply's (c) connector.
2. Plug the power cable (a) into an A/C plug.
3. The power supply is fully charged when the ▮ ← indicator light on the power supply switches on.
4. Remove the power cable from the A/C plug after the charging process.



ScanStation 2_014

Caution

To avoid connector damage, unplug the charger before connecting it to the power supply.

If the power supply is turned on while charging, the status displayed at the power supply is invalid.
Always turn off the power supply if not used to prevent its batteries from discharging.

Period of use, life span of the power supply

Understand the power supply's period of use and life span:

- Operation time for a fully charged power supply is approximately 3 hours at room temperature. The instrument can be operated for 6 continuous hours using two power supplies.

- After 200 to 300 cycles, consider contacting Leica Geosystems or your distributor to replace the power supply.



Before storing the power supply for a longer period of time, recharge it to avoid shortening the life span.
Before storage, turn off the power supply.

Notify support

Please notify the support team, if you notice any of the following behaviours:

-  LED does not turn off after unplugging the charger.
-  LED stays on after eight hours of charging time.
- The **power supply is hot** after the charging process.

Handling advice

- Do not charge the power supply more than eight hours.
- Power supply needs to be turned off during the charging process.
- Properly remove the wall plug first, before removing the Lemo connector.
- Do not tamper with the power supply or charger during charging or usage.
- Do not obstruct vent holes on the bottom of the power supply.
- Do not put flammable objects near the power supply during charging or usage.
- Do not store discharged power supply below 0° C/32° F.

2.6 Operate the Instrument With the Power Supply

Caution

To avoid connector damage, turn off the power supply before connecting it to the instrument.

Precautions:

1. Verify that the power supply is off.
2. Connect the power supply cable to the instrument and to the power supply.
3. Turn on the power supply.
   - A red power supply LED means that the power supply is empty and must be recharged immediately after finishing the current scan. If the power supply is further discharged, it turns off automatically without further warning. If the power is turned off while scanning, the software can crash and you can lose data.
4. To turn on the power supply after it has automatically turned off, turn the switch from the "On" position to the "Off" position and back again to the "On" position.

In addition to the battery indicator of the power supply, the remaining power is also displayed by the software when connected. This display is an approximation and can differ from the status shown by the power supply. In this case, the display of the power supply is valid.

3 Scanning

3.1 Turn On the System

System Start up

1. Set up the instrument as desired. Refer to chapter "2 Setting Up the Instrument" for more infomation.
2. Turn on the laptop computer.
3. Connect all cables to the instrument as described earlier. Refer to chapter "1.3 Cabling" for more infomation.
4. Remove the window covers from the instrument. The window covers can be hooked up on the tripod or placed in the instrument's case.
5. Unlock the instrument by pulling the black knob on the back and turning it to its "UNLOCKED" position.



The instrument must be in the **UNLOCKED** position **for power-up** (see picture on page 36). Otherwise *Cyclone* will continue to try to connect while the instrument does not start up correctly.
Note that the instrument is rotating freely when in UNLOCKED position and powered OFF.

6. Switch on the power supplies or connect the A/C power supply. Refer to chapter "1.3 Cabling" for more information.
7. The **RDY yellow light** (see picture on page 36) should be **flashing** while the instrument is getting ready for scanning.

The power-up process requires approximately five minutes to complete. During the power-up process, you will see the scanner rotate and the mirror behind the scanner main window will spin.

8. The **instrument is ready when the RDY light is green**. Note that it is no longer in the free rotational mode when powered up.

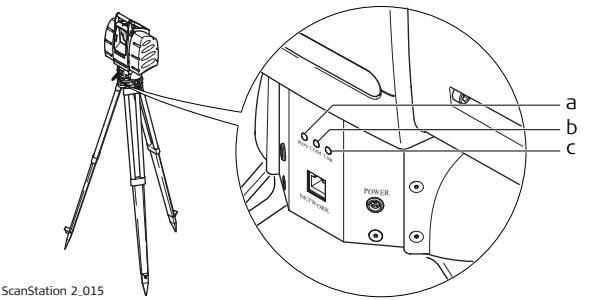


The instrument should never be touched while powering up or when ready. It should not be touched during operation with the exception of the QuickScan operation. Refer to the QuickScan section of the *Cyclone* documentation for further details.

9. To connect the instrument to *Cyclone* software and begin scanning operations, refer to the *Cyclone* documentation for further information.
10. Start *Cyclone*.

3.2 Understand the Instrument's Control LED Status

Diagram



ScanStation 2_015

a) **RDY** LED
b) **COM** LED
c) **LSR** LED

RDY

Flashing yellow color indicates that the instrument is powering up. Green color indicates that the instrument is ready for scanning.
If the flashing yellow light appears while the instrument is scanning or waiting for a command, it indicates that it is performing a self-accuracy adjustment. This procedure takes approximately two minutes.
If the instrument is scanning when self-accuracy adjustment starts, scanning will be interrupted for approximately two minutes and then automatically restart.

COM	Flashing green color indicates that the instrument is communicating with *Cyclone*. Red color indicates a scanner failure. Please refer to chapter "Diagnostic Procedure" for further instructions if this happens.
LSR	Orange color indicates that the laser is ON. The LSR light is always orange once the scanner completes the power up process.

3.3 Ambient Conditions

Unfavorable surfaces

- Highly reflective (polished metal, gloss paint)
- Highly absorbent (black)
- Translucent (clear glass)

Color or powder these surfaces before scanning if necessary.

Unfavourable weather conditions

- Rain, snow or fog cause poor measurements. It is not recommended to survey during these conditions!
- If some objects are scanned against the sunlight or a bright spotlight, the optical receiver of the instrument can be dazzled so heavily that in this area no measured data is recorded. A "black hole" appears in the reflectance image.

Temperature changes

- If the instrument is brought from a cold environment (e.g., from storage) into a warm and humid environment, the glass window at the mirror or in extreme case even the interior optics can fog up. This causes measurement errors.
  Precaution: Avoid large temperature differences; give the instrument time to acclimate.

Window Glass

Soiling at the glass, such as a layer of dust, condensed water or fingerprints, causes considerable measuring errors.

Laptop computer

- Retain enough fee disk space, depending on your Project, up to 50% of your hard drive.
- Do not additionally stress the computer while scanning.
- It is not recommended to perform other *Cyclone* tasks while Scanning.

Others

Keep field notes containing:

- Target positions relative to the instrument.
- Position of the instrument within the measured area.

***Cyclone*-SCAN**

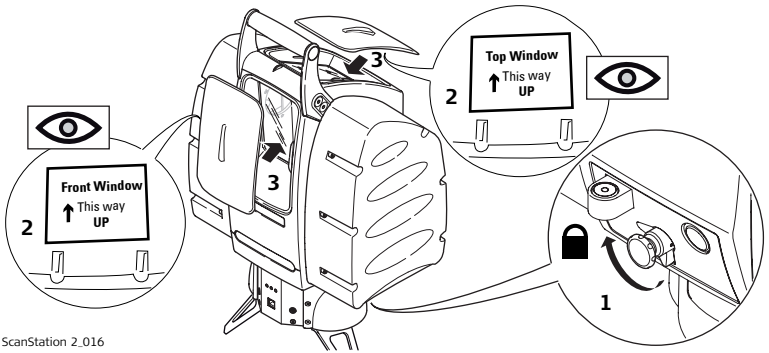
The *Cyclone*-SCAN software controls scanning operations with the instrument and allows point cloud visualization and measurement.

- Refer to the *Cyclone* help system for information about the connection of the instrument to *Cyclone* and further scanning operations.

3.4 Reinstalling Window Covers

Procedure

1. Ensure that the instrument is switched off and lock the instrument by pulling the black knob on the back and turning it to its **LOCKED** position.
2. Check the back of the window covers before reinstalling to assure proper orientation.
3. Push window cover with a light pressure to lock it in place.



ScanStation 2_016

3.5 Network Address

Network address	Please refer to the type plate on the ScanStation 2 for its Network address.
	Please note your network address under "Product identification" on page 2.

4 Troubleshooting

4.1 Network Connection

Physical problems

1. Is one end of the ethernet cable securely attached to the connector labeled NETWORK on the instrument base?
2. Is the other end of the ethernet cable securely attached to the laptop?
3. Is the COM indicator light on the instrument base lit? This indicates that the instrument networking module has power.
4. Are you using the correct network cable? You can tell by holding the two modular connectors side-by-side. The colored wires inside the two modular connectors should be in the same order if the cable is directly connecting the instrument to the laptop.

Software configuration problems

1. Start *Cyclone*.
2. Start the Scan Control viewer for your scanner.
3. Initiate connection to the instrument.
4. If the progress bar remains at 10%, then *Cyclone* cannot locate the scanner on the network.
   - Check that your laptop network settings are correct. Check IP address, LAN properties, **internet protocol (TCP/IP) properties**:
     IP address: refer to chapter "3.5 Network Address"
     Subnet mask: 255.255.0.0

Default gateway: 10.1.1.1

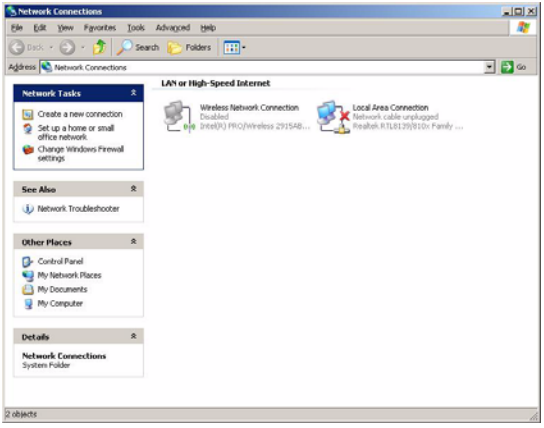
- If your network settings are correct, check if you have a wireless network enabled. An active wireless network may disrupt the connection between *Cyclone* and the instrument.

5. If the progress bar remains at 40% or 70%, then *Cyclone* is able to locate the instrument on the network but is unable to complete the connection protocol.
   - If the instrument is initializing or performing its periodic accuracy checking, *Cyclone* may not be able to connect until the scanner is ready. This is normal. Refer to chapter "3.2 Understand the Instrument's Control LED Status" for more information.
   - If *Cyclone* has not successfully connected within ten minutes:
     a) Cancel the connection.
     b) Exit *Cyclone*.
     c) Confirm that *Cyclone* is not running by looking for *Cyclone*.exe in the Task Manager's Processes tab. If it is continuing to run, select the *Cyclone*.exe process and push the End Process button.
     d) Restart *Cyclone* and try to connect once more.
     e) If the second attempt fails, reboot the instrument.
     f) If the third attempt fails, reboot the laptop computer and the Scanner, then attempt to connect to the instrument.
6. If connection to the instrument still fails, initiate the diagnostic procedure described in chapter "4.2 Diagnostic Procedure".

Configuration of wireless network adapter

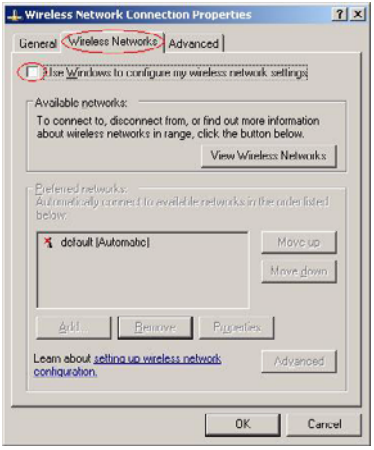
Laptops delivered by Leica Geosystems together with a laser scanning system have a built-in wireless network adapter.
You may enable/disable the wireless network adapter by following the next steps:

1. Open Network Connections.
2. Right-click **Wireless Network Connection**, and then click **Properties**.



3. Select the **Wireless Networks** tab.

4. To enable automatic wireless network configuration, select the **Use Windows to configure my wireless network settings** check box; or to disable automatic wireless network configuration, clear the **Use Windows to configure my wireless network settings** check box.



4.2 Diagnostic Procedure

Diagnostic procedure

The diagnostic procedure explains how to create diagnostic reports in case of problems with the scanner and/or the connection.

To create diagnostic reports, follow the steps described below:

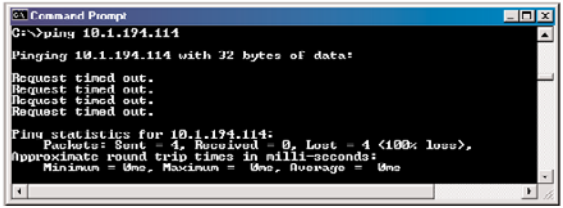
1. Connect the ethernet cable to the instrument and the laptop.
2. Start *Cyclone* and open a Scan Control window (see *Cyclone* on-line help).
3. Switch on the instrument.
4. Connect to the instrument from the *Cyclone* Scan Control window. Diagnostic information is stored in a text file as soon as you try to connect. A new diagnostic file is created for each new connection in the following folder on your laptop:
   ...\Leica Geosystems*Cyclone*\Databases\temp
   Example file name: Diag_10.1.194.114_2004.03.04.11.45.txt

Verify the network address

If you cannot connect to the instrument after booting up and diagnostic reports are not created, check the network address of the instrument. To verify the network address, try to ping the instrument.

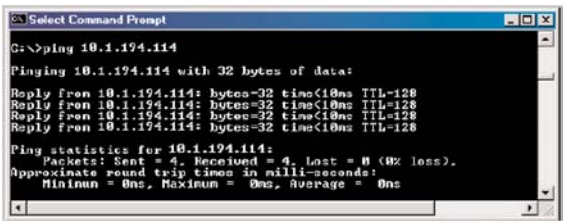
1. Open the DOS window: From the Windows desktop, click the Start button, and then point to Programs and click MS DOS Prompt. The DOS window appears.
2. At the cursor, type **ping 10.1.194.X** (10.1.194.X is the instrument's network address) and press ENTER. The ping process begins.

DOS window illustrating an **unsuccessful ping procedure**:



"Request timed out" is one of several possible responses indicating failure of the ping procedure.

DOS window illustrating a **successful ping procedure**:



3. If the ping procedure fails, and you have verified that you are using a properly connected ethernet cable, the cable may be broken.
   - Turn the power switch OFF, and replace the ethernet cable (make sure to use a standard ethernet cable).
   - Turn the instrument "ON."
   - If the ping procedure still fails, contact Leica HDS Technical Support.

In case of problems

If you experience one of the following problems with the scanner and/or the scanner connection:

- If the instrument does not boot up:
  Switch off the instrument and switch it on again. Try to connect to the instrument from the Scan Control window. Diagnostic reports are stored every time you attempt to connect to the scanner.
- If the instrument boots up and the RDY light is on, but connection is not possible:
  Try to ping the instrument (see ping procedure above).
- If there is no diagnostic report, check the network address of the instrument and the network settings on your laptop.
- If you experience problems while scanning, or taking images, Email a copy of the diagnostic report to Leica HDS Technical Support.
- If the COM light is red:
  Reboot the instrument. If the light is still red, contact Leica HDS Technical Support.

Summary

If you experience problems with your instrument:

- Email the scanner's diagnostic reports to your local support:
  - Email address: support@lgshds.com
  - For Europe support: euro-support@lgshds.com

- Diagnostic reports are stored in the following folder:
  - ...\Leica Geosystems*Cyclone*\Databases\temp
  - Example file name: Diag_10.1.194.114_2004.03.04.11.45.txt

5 Care and Transport

5.1 Check & Adjust

Caution

Units that are exposed to high mechanical forces, e.g. through frequent transport or rough handling, it is recommended to carry out a check and adjust once a year by the manufacturer respectively just after such a high stress exposure.

5.2 Transport

Transport in the field

When transporting the equipment in the field, always make sure that you
- either carry the product in its original transport container,
- remove product from tripod and carry by its handle.

Transport in a road vehicle

Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.

Shipping

When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.

Shipping, transport of batteries

When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

5.3 Storage

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "7 Technical Data" for information about temperature limits.

Field adjustment

After long periods of storage, inspect the field adjustment parameters given in this user manual before using the product.

Batteries

- Refer to "7.5 Environmental" for information about storage temperature range.
- A storage temperature range of -20°C to +30°C/-4°F to 86°F in a dry environment is recommended to minimize self-discharging of the battery.
- At the recommended storage temperature range, batteries containing a 10% to 50% charge can be stored for up to one year. After this storage period the batteries must be recharged.
- Remove batteries from the product and the charger before storing.
- After storage, recharge batteries before using.
- Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.

5.4 Cleaning and Drying

Windows and targets

- Blow dust off scanner windows.
- Never touch the glass with your fingers.
- Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol.
- Do not use other liquids; these may attack the polymer components.
- Charger:
  Use only a clean, soft, lint-free cloth for cleaning.

Damp products

Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C / 104°F and clean them. Do not repack until everything is completely dry.

Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

5.5 Window Cleaning Procedure

General

The ScanStation 2 scanning windows shall be kept clean. The instructions must be followed as described in this chapter to clean the scanner windows.

Warning

Direct intrabeam viewing is always hazardous.
Precautions:
Before cleaning windows, ensure the instrument is switched off.

Window Cleaning Kit can be ordered through your local Leica Geosystems dealer.

Cleaning of the optics

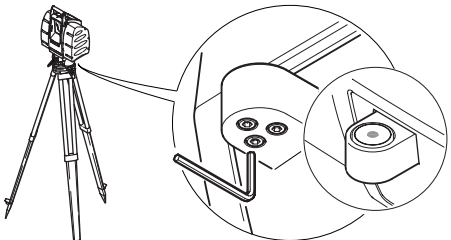
Clean the glass pane regularly with the provided cleaning kit:

- Switch off instrument.
- Washing hands is necessary in order to avoid grease on the cleaning tissue.
- Better, use gloves to avoid finger oil on the glass.
- Then use the lens tissue for wiping circularly from the center to the edge until there is only a thin film of detergent visible.
- Use a new lens tissue for drying the pane, wipe circularly.
- If any smears from cleaning are visible against back light, repeat the procedure.
- Do not touch the side of the paper that is used for cleaning with your fingers.

- Do not reuse tissues that have been used before.
- Only use non-fuzzy lens tissues.
- Do not use air from the pneumatic power system as this is always slightly oily!

5.6 Adjustment of the Circular Level

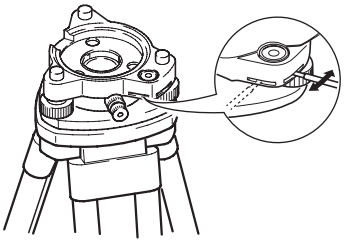
On the instrument step-by-step



ScanStation 2_017

Step	Description
1.	Level up the instrument in advance using the re-level functionality in *Cyclone*, assuming that the instrument is correctly adjusted.
2.	The bubble must be centered. If it extends beyond the circle, use an allen key to center it with the adjustment screws. Turn the instrument slowly 200 gon (180°). Repeat the adjustment procedure if the bubble does not stay centered.
☞	After the adjustment, no screw shall be loose.

On the tribrach step-by-step

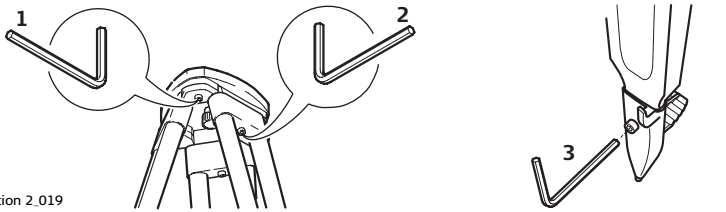


ScanStation 2_018

Step	Description
1.	Level up the tribrach together with the instrument in advance using the re-level funtionality in *Cyclone*, assuming that the instrument is correctly adjusted. Remove the instrument from the tribrach.
2.	The bubble of the tribrach must be centered. If it extends beyond the circle, use the adjusting pin in conjunction with the two cross-headed adjustment screws to centre it.
☞	After the adjustment, no screw shall be loose.

5.7 Service of the Tripod

Service tripod step-by-step



ScanStation 2_019

Step	Description
☞	The connections between timber and metal must be firm and tight.
1.	Moderately tighten the allen screws (1) with the allen key supplied with the tripod.
2.	Tighten articulated joints just enough to keep the tripod legs open when lifting the tripod off the ground (2).
3.	Tighten the allen screws of the tripod legs (3).

6 Safety Directions

6.1 General

Description

The following directions should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

6.2 Intended Use

Permitted use

- Measuring horizontal and vertical angles.
- Measuring distances.
- Recording measurements.
- Computing by means of software.
- Target search, recognition.
- Visualizing the aiming direction and vertical axis.
- Remote control of surveying products.
- Data communication with external appliances.

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.

- Inadequate safeguards at the surveying site, for example when measuring on roads.
- Deliberate dazzling of third parties.
- Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.

Warning

Adverse use can lead to injury, malfunction and damage.
It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

6.3 Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

Danger

Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

6.4 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Leica Geosystems immediately if the product and the application becomes unsafe.

Warning

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

6.5 International Warranty, Software Licence Agreement

International Warranty

The International Warranty can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/internationalwarranty or received from your Leica Geosystems dealer.

Software Licence Agreement

This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online pursuant to prior authorization from Leica Geosystems. Such software is protected by copyright and other laws and its use is defined and regulated by the Leica Geosystems Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances, Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the Leica Geosystems Software Licence Agreement.

Such agreement is provided together with all products and can also be found at the Leica Geosystems home page at http://www.leica-geosystems.com/swlicense or your Leica Geosystems dealer.

You must not install or use the software unless you have read and accepted the terms and conditions of the Leica Geosystems Software Licence Agreement. Installation or use of the software or any part thereof, is deemed to be an acceptance of all the terms and conditions of such licence agreement. If you do not agree to all or

some of the terms of such licence agreement, you may not download, install or use the software and you must return the unused software together with its accompanying documentation and the purchase receipt to the dealer from whom you purchased the product within ten (10) days of purchase to obtain a full refund of the purchase price.

6.6 Hazards of Use

Warning

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.
Precautions:
All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

Caution

Watch out for erroneous measurement results if the product has been dropped or has been misused, modified, stored for long periods or transported.
Precautions:
Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the product has been subjected to abnormal use and before and after important measurements.

Danger

Because of the risk of electrocution, it is very dangerous to use poles and extensions in the vicinity of electrical installations such as power cables or electrical railways.

Precautions:

Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.



Warning

If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.

Precautions:

Do not use the product in a thunderstorm.

Warning

During dynamic applications, for example stakeout procedures, there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.

Precautions:

The person responsible for the product must make all users fully aware of the existing dangers.

Warning

Inadequate securing of the surveying site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.
Precautions:
Always ensure that the survey site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

Warning

If computers intended for use indoors are used in the field there is a danger of electric shock.
Precautions:
Adhere to the instructions given by the computer manufacturer with regard to field use in conjunction with Leica Geosystems products.

Caution

If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people may sustain injury.
Precautions:
When setting-up the product, make sure that the accessories, for example tripod, tribrach, connecting cables, are correctly adapted, fitted, secured, and locked in position.
Avoid subjecting the product to mechanical stress.

Warning

Only Leica Geosystems authorized service workshops are entitled to repair these products.

Warning

Using a battery charger not recommended by Leica Geosystems can destroy the batteries. This can cause fire or explosions.
Precautions:
Only use chargers recommended by Leica Geosystems to charge the batteries.

Danger

Death or serious injury can occur if unit is not connected to ground.
Precautions:
To avoid electric shock power cable and power outlet must be grounded.



Warning

High mechanical stress, high ambient temperatures or immersion into fluids can cause leackage, fire or explosions of the batteries.
Precautions:
Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

Warning

Short circuited battery terminals can overheat and cause injury or fire, for example by storing or transporting in pockets if battery terminals come in contact with jewellery, keys, metallized paper or other metals.
Precautions:
Make sure that the battery terminals do not come into contact with metallic objects.

Caution

Direct rain or water may damage and/or reduced lifetime on the battery.
Precautions:
During outdoor use keep the battery in an against rain protected place.

Caution

Long term storage may reduce lifetime or damage the battery.
Precautions:
During long term storage, maintain battery life by periodic re-charge.

Warning

During usage, charging and/or disposal one of the following can occur with impact to humans and environment:



Explosion hazard:
A highly-explosive oxyhydrogen gas mixture occurs when charging batteries.



Precautions:
Fires, sparks, naked lights and smoking are prohibited:
Avoid causing sparks when dealing with cables and electrical equipment, and beware of electrostatic discharges. Avoid short-circuits.



Corrosive hazard:
Battery acid is highly corrosive.
Precautions:
Wear protective gloves and eye protection. Do not tilt battery, acid can escape from the degassing openings or vents.

⚠ Caution

During the transport, shipping or disposal of batteries, it is possible for inappropriate mechanical influences to constitute a fire hazard.
Precautions:
When transporting shipping, or disposing batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

⚠ Warning

Charging or operating the battery at temperatures below 0°C / +32°F or above +40°C / +104°F is not allowed since it may damage the battery.
Precautions:
Only charge the battery in well-ventilated areas because it can produce explosive gases. Connect the battery to the battery charger only when the charger is turned off. Fire, smoking, and sparking near the battery are not allowed.

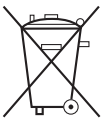
⚠ Warning

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.

- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorized persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.
- Improper disposal of silicone oil may cause environmental contamination.

Precautions:



The product must not be disposed of with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.
Always prevent access to the product by unauthorized personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

For Power Supply:

Danger

The product is not designed for use under wet and severe conditions. If unit becomes wet it may cause you to receive an electric shock.

Precautions:

Use the product only in dry environments, for example in buildings or vehicles. Protect the product against humidity. If the product becomes humid, it must not be used!



Warning

If you open the product, either of the following actions may cause you to receive an electric shock:

- Touching live components.
- Using the product after incorrect attempts were made to carry out repairs.

Precautions:

Do not open the product. Only Leica Geosystems authorized service workshops are entitled to repair these products.

⚠ Warning

Batteries not recommended by Leica Geosystems may be damaged if charged or discharged. They may burn and explode.

Precautions:

Only charge and discharge batteries recommended by Leica Geosystems.

6.7 Laser Classification Scanner, Visible Laser

General

The laser incorporated into the product produces a visible green laser beam which emerges from the windows.

The products are Class 3R Laser Products in accordance with:
- IEC 60825-1 (2001-08): "Safety of Laser Products".
- EN 60825-1:1994 + A11:1996 + A2:2001: "Safety of Laser Products".

Class 3R Laser Products:
Direct intrabeam viewing is always hazardous. Avoid direct eye exposure. The accessible emission limit is within five times the accessible emission limits of Class 2 in the wavelength range from 400 nm to 700 nm.

Description	Value
Maximum average radiant power	1.5 mW
Maximum peak radiant power	120 W
Pulse duration	250 ps
Pulse repetition frequency	$\leq$ 50'000 Hz
Beam divergence (full angle)	0.15 mrad
Beam waist location	20 m

Description	Value
Beam waist diameter (1/e)	3.2 mm

Warning

For safety aspects direct intrabeam viewing should be considered always as hazardous.
Precautions:
Do not stare into the beam or direct it towards other people unnecessarily. These measures are also valid for the reflected beam.

Warning

Looking directly into the reflected laser beam could be dangerous to the eyes when the laser beam is aimed at areas that reflect like a mirror or emit reflections unexpectedly, for example prisms, mirrors, metallic surfaces or windows.
Precautions:
Do not aim at areas that are essentially reflective, such as a mirror, or which could emit unwanted reflections.

Warning

The use of Laser Class 3R equipment can be dangerous.
Precautions:
To counteract hazards, it is essential for every user to respect the safety precautions and control measures specified in the standard IEC 60825-1 (2001-08) resp. EN 60825-1:1994 + A11:1996 + A2:2001, within the hazard distance *); pay particular attention to Section Three "User's Guide".

Following an interpretation of the main points in the relevant section of the standard quoted.

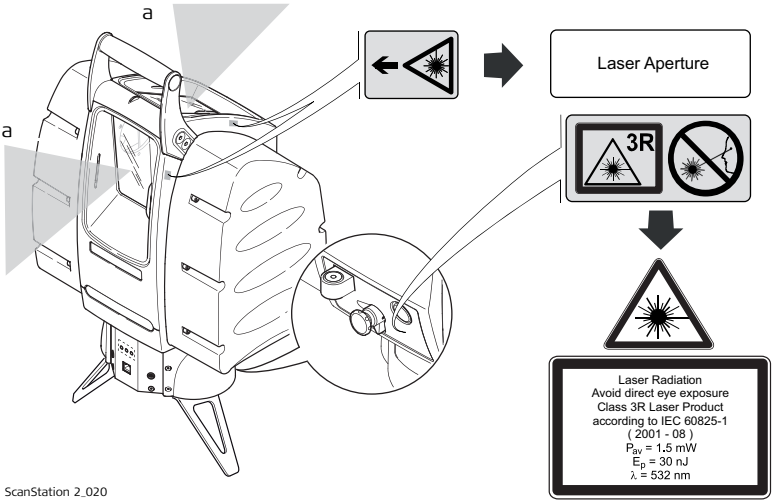
Class 3R Laser Products used on construction sites and outdoors, for example surveying, alignment, levelling:

a) Only qualified and trained persons should be assigned to install, adjust and operate the laser equipment.
b) Areas in which these lasers are used should be posted with an appropriate laser warning sign.
c) Precautions should be taken to ensure that persons do not look directly, with or without an optical instrument, into the beam.
d) The laser beam should be terminated at the end of its useful beam path and should in all cases be terminated if the hazardous beam path extends beyond the limit (hazard distance *) of the area in which the presence and activities of personnel are monitored for reasons of protection from laser radiation.
e) The laser beam path should be located well above or below eye level wherever practicable.
f) When not in use the Laser Product should be stored in a location where unauthorized personnel cannot gain access.
g) Precautions should be taken to ensure that the laser beam is not unintentionally directed at mirror-like, specular surfaces for example mirrors, metal surfaces or windows. But, more importantly, at flat or concave mirror-like surfaces.

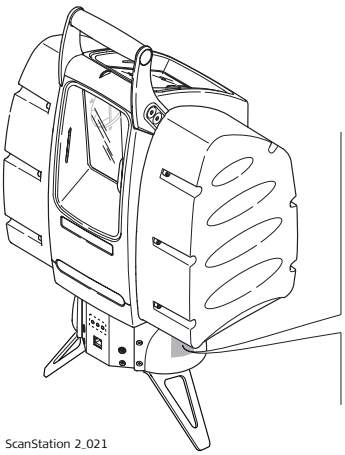
*) The hazard distance is the distance from the laser at which beam irradiance or radiant exposure equals the maximum permissible value to which personnel may be exposed without being exposed to a health risk.

The hazard distance for this product is 115 m / 378 ft., taking into account an exposure time of 0.25 s.

Labelling



a) Laser beam



ScanStation 2_021

Power: 36V ⎓, 4.0A max

6.8 Electromagnetic Compatibility EMC

Description

The term Electromagnetic Compatability is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

Warning

Electromagnetic radiation can cause disturbances in other equipment.

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Caution

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠ Caution

Disturbances caused by electromagnetic radiation can result in erroneous measurements.
Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by very intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.
Precautions:
Check the plausibility of results obtained under these conditions.

⚠ Warning

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.
Precautions:
While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

6.9 FCC Statement, Applicable in U.S.

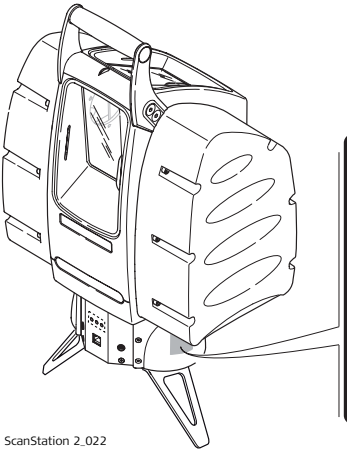
Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning

Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

Labelling ScanStation 2



ScanStation 2_022

Leica Geosystems AG
CH-9435 Heerbrugg
Made in Switzerland

MODEL NO. | **SERIAL NO.**

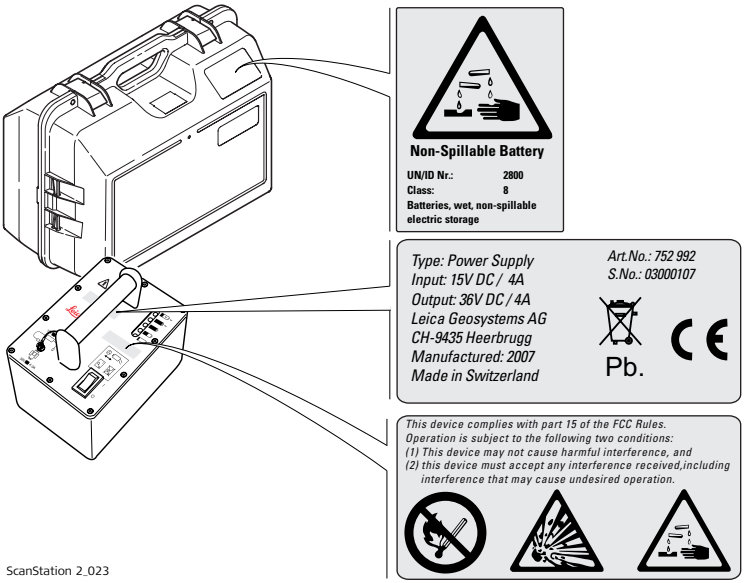
MANUFACTURED:

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received,including interference that may cause undesired operation.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No.50, dated July 26,2001.

Power: 36V ⎓, 4.0A max

Labelling power supply



ScanStation 2_023

7 Technical Data

7.1 General Technical Data of the Instrument

Instrument type	Pulsed, dual-axis compensated, high-speed laser scanner, with survey-grade accuracy, range, and field-of-view
User interface	Notebook or Tablet PC
Scanner drive	Servo motor
Camera	Integrated high-resolution digital camera

7.2 System Performance

Accuracy of single measurement	Position[1]:	6 mm
	Distance[1]:	4 mm
	Angle (horizontal/vertical)	12" / 12" (60 µrad / 60 µrad), 1 δ
Modeled surface precision[2]/noise	2 mm, 1 δ	
Target acquisition[3]	2 mm standard deviation	
Dual-axis compensator	Selectable on/off; Setting accuracy: 1.5" / 7.275 µrad	
Data integrity monitoring	Periodic self-check during operation and start-up	

All ± accuracy specifications are one sigma (1 δ) unless otherwise noted.

1 At 1 m - 50 m range, 1 δ

2 Subject to modeling methodology for modeled surface

3 Algorithmic fit to planar HDS targets

7.3 Laser Scanning System

Type	Pulsed; proprietary microchip	
Color	Green; visible	
Range	300 m @ 90%; 134 m @ 18% albedo	
Scan rate	up to 50'000 points/sec, maximum instantaneous rate	
Scan resolution	Spot size:	≤ 6 mm from 0 - 50 m (based on Gaussian definition) **
	Selectability:	Independently, fully selectable vertical and horizontal point-to-point measurement spacing **
	Point spacing:	Fully selectable horizontal & vertical; through full range **
	Scan row (horizontal):	20'000 points/row, maximum **
	Scan column (vertical):	5'000 points/column, maximum **
Field-of-View (per scan)	Horizontal:	360º (maximum) **
	Vertical:	270º (maximum) **
	Aiming/Sighting:	Optical sighting using QuickScan™ button

** SmartScan™ Technology feature.

Scanning Optics	Single mirror, panoramic, front & upper window design Environmentally protected by housing and two glass shields
Scan motors	Direct drive, brushless
Data & power transfer to/from rotating turret	Contact-free: optical data link and inductive power transfer
Communications	Static Internet Protocol (IP) Address
Integrated color digital imaging	• User-defined pixel resolution: Low, Medium, High • Single 24° x 24° image: 1024 x 1024 pixels (1 megapixel) @ "High" setting • Full 360° x 270° dome: 111 images, approx. 64 megapixels, automatically spatially rectified
Status Indicators	3 LEDs (on stationary base) indicate system ready; laser "on", and communications status
Bubble level	External, integrated on back side of rotating scan head

7.4 Electrical

Power supply	36 V; AC or DC; hot swappable; Two (2) Power Supply units provided with system.
Power consumption	<80 W, average
Battery type	Sealed lead acid
Power ports	Two (2) simultaneous use, hot swappable
Duration	>6 hours, typical continuous use (room temperature), using both batteries simultaneously
Power status indicators	Five (5) LEDs indicate charging status and power levels (low/medium/high)

7.5 Environmental

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
ScanStation 2	0 to +40	-25 to +65
Power supply	0 to +40	-25 to +65
Power supply charger	0 to +40	-25 to +65
A/C power supply	0 to +40	-25 to +65

Protection against water, dust and sand
IP52 (IEC 60529)

Humidity
Max 95 % non condensing

Lighting

Fully operational from bright sunlight to complete darkness.

7.6 Physical

Dimensions

Instrument	Dimensions [mm] (D x W x H)	Dimensions ["] (D x W x H)
ScanStation 2; without handles & table stand	265 x 370 x 510	10.5 x 14.5 x 20
Power supply; without handles	165 x 236 x 215	6.5 x 9.25 x 8.5

Weight

Instrument	Weight [kg]	Weight [lbs]
ScanStation 2	18.8, nominal	41, nominal
Power supply	12, nominal	26, nominal

7.7 Accessories

Standard Accessories

- Scanner transport case
- Tribrach (Leica Professional Series)
- Survey tripod
- Ethernet cable for connection of scanner to notebook PC
- Two Power Supply cases. Each includes:
  - Power Supply
  - Cable for battery connection to scanner
  - Power Supply charger
- *Cyclone*™-SCAN software

Hardware options

- Notebook PC (Standard or Enhanced)
- Tablet PC
- HDS scan targets and target accessories
- Service agreement for Leica ScanStation 2
- Extended warranty for Leica ScanStation 2

Notebook PC for scanning

Component	Minimum requirements
Processor	1.4 GHz Pentium M or greater
System memory RAM	512MB or greater (SDRAM)

Component	Minimum requirements
Hard Disk	40GB or greater, (5'400RPM or faster)
Network connection	Ethernet
Display	SXGA+ (64MB or greater, video RAM recommended)
Operating system	Windows XP (SP1 or higher) Windows 2000 (SP2 or higher with up-to-date security patches)
File System	NTFS
Power	Additional battery, 2 preferred

☞ Minimum requirements for modeling operations are different. Please refer to *Cyclone* datasheet for specifications, available at your Leica Geosystems dealer.

***Cyclone* – Scan**

Features:

- Independent vertical and horizontal scan density **
- Scan filters: range, intensity **
- Selection of scan area via scribed rectangle or pre-sets**
- Atmospheric correction

- Customizable longitude/latitude grid lines
- Targeted, single-shot pre-scan ranging **
- Script management for auto scan sequencing **
- View scanner locations and field-of-view
- Level of detail (LOD) for fast visualization
- Auto rechecking (re-acquisition) of targets **
- Auto acquisition of HDS targets **
- Target identification
- Traverse **
- Field Setup - Resection **
- Field Setup - Known Backsight **
- Field Setup - Known Azimuth **
- Traverse and resection reports
- Direct coordinate/station entry **
- Dual-axis compensation on/off
- Engage/disengage turret
- Target and instrument height input
- Lighting control for digital images
- Acquire and display digital image
- Set image resolution (high, medium, low)
- Support of external digital images
- Real-time 3D visualization while scanning **

- Fly-around, pan & zoom, rotate clouds, meshes, models in 3D
- View point clouds with intensity or true-color mapping
- Auto creation of panoramic digital image mosaic **
- Global digital image viewer **
- Point-and-scan QuickScan to set horizontal FoV **
- User-defined quality-of-fit checks
- Measure & dimension: slope dist., ΔX, ΔY, ΔZ
- Create, manage annotations and layers
- Save/restore views
- Save screen images
- Undo/redo support

** SmartScan™ Technology feature.

7.8 Formats

Direct import formats	• *Cyclone* native IMP object database format • *Cyclone* Object Exchange (COE) format • ASCII point data (XYZ, SVY, PTS, PTX, TXT) • Leica's X-Function DBX format • LandXML • ZFS • ZFC • 3DD • SIMA format
Direct export formats	• ASCII point data (XYZ, SVY, PTS, PTX, TXT) customized format • Leica's X-Function DBX format • LandXML • SIMA format
Indirect export formats	• AutoCAD (via COE for AutoCAD plug-in) • MicroStation (via COE for MicroStation plug-in) • PDS (via MicroStation, COE for MicroStation plug-ing) • AutoPLANT (via AutoCAD, COE for MicroStation plug-in)

Index

A
Adjustment
Of circular level on instrument 56
Of circular level on tribrach 57

C
Charging cable 13

E
Ethernet cable 15

F
Field of View 17

H
HDS Cyclone Software Suite 19

L
Laptop 8

O
Operate the instrument
With the power supply 12, 33
With the power supply charger 15, 29

P
Power supply 8
Power supply cable 8, 15
Protective cover 8

R
Range 88

S
Scan rate 88
Scan resolution 88
ScanStation 2 Laser Scanner 8
Service, of tripod 58
Set up the tripod 23, 26
System Start up 34

T

Tripod 8
Tripod, service of 58

759947-1.0.0en
Original text
Printed in Switzerland © 2007 Leica Geosystems AG, Heerbrugg, Switzerland

Leica Geosystems AG
Heinrich-Wild-Strasse
CH-9435 Heerbrugg
Switzerland
Phone +41 71 727 31 31
www.leica-geosystems.com

- when it has to be **right**

Leica Geosystems